UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,897	11/27/2001	Masayuki Fukumi	829-590	7681

7590 05/08/2003

NIXON & VANDERHYE P.C.
8th Floor
1100 North Glebe Road
Arlington, VA 22201

EXAMINER
ROMAN, ANGEL

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/993,897	Applicant(s) FUKUMI, MASAYUKI
	Examiner Angel Roman	Art Unit 2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 6-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 6-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 2 and 6-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The new added claim limitation "with no circuit or device element located therebetween", is a contradictory, indefinite and inconsistent limitation since applicant's are claiming a thin film insulator which is a circuit and a device element and is located between the two substrates.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Fueki et al. U.S. Patent 5,476,820 A.

Fueki et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 1 including a concave-convex surface; a second semiconductor substrate 3 having a non-glass thin film insulator 2 on a surface thereof, wherein the first semiconductor substrate 1 and the second semiconductor substrate 3 are together so that the concave-convex surface of the first semiconductor substrate 1 and the thin film insulator provided on the surface if the second semiconductor substrate 3 contact each other wherein the thin film insulator is the only circuit or device element located therebetween, to form a cavity 5 in the semiconductor substrate device. The non-glass thin film insulator has a thickness less than a thickness of the second semiconductor substrate 3 (see figure 7) and is not a semiconductor (see column 4, lines 63-66).

5. Claims 1, 7 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Itoigawa et al. U.S. Patent 5,946,549 A.

Itoigawa et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 22 including a concave-convex surface; a second semiconductor substrate 25 having a non-glass thin film silicon insulator (24a, 24b) on a surface thereof, wherein the first semiconductor substrate 22 and the second semiconductor substrate 25 are together so that the concave-convex surface of the first semiconductor substrate 22 and the thin film insulator provided on the surface of the

second semiconductor substrate 25 contact each other, wherein the thin film silicon insulator is the only circuit or device element located therebetween, to form a cavity in the semiconductor substrate device (see figure 9D).

6. Claims 1, 8 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Satou U.S. Patent 5,335,550 A.

Satou discloses a semiconductor substrate device, comprising; a first semiconductor substrate 12 including a concave-convex surface; a second semiconductor substrate 11 having a thin film silicon oxide insulator 8 on a surface thereof, wherein the first semiconductor substrate 12 and the second semiconductor substrate 11 are together so that the concave-convex surface of the first semiconductor substrate 12 and the thin film silicon oxide insulator 8 provided on the surface of the second semiconductor substrate 11 contact each other, wherein the thin film silicon oxide insulator is the only circuit or device element located therebetween, to form a cavity in the semiconductor substrate device. The thin film insulator has a thickness less than a thickness of the second semiconductor substrate 11 (see figure 8).

7. Claims 1, 2 and 10-12 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ishio et al. U.S. Patent 6,448,624 B1.

Ishio et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 21 including a concave-convex surface; a second semiconductor substrate 26 having a non-glass thin film insulator 29 on a surface

thereof, wherein the first semiconductor substrate 21 and the second semiconductor substrate 26 are together so that the concave-convex surface of the first semiconductor substrate 21 and the thin film insulator 29 provided on the surface if the second semiconductor substrate 26 contact each other wherein the thin film insulator is the only circuit or device element located therebetween, to form a cavity in the semiconductor substrate device. The concave-convex portion of the semiconductor substrate 21 is defined by a plurality of concave-convex portions formed at equal intervals, wherein widths of the concave portions narrows as the depth of the concave portions increases (see figure 1). The non-glass thin film insulator 29 has a thickness less than a thickness of the second semiconductor substrate 26 (see figure 1) and is not a semiconductor (see column 10, lines 12-16).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bang et al. U.S. Patent 5,264,375 A.

Bang et al. discloses a semiconductor substrate device, comprising; a first semiconductor substrate 18 including a concave-convex surface; and a second

semiconductor substrate 14 thin film insulator 16 on a surface thereof, the surface of the second semiconductor substrate being implanted with hydrogen (see column 3, lines 54-60), wherein the first semiconductor substrate 18 and the second semiconductor substrate 14 are together so that the concave-convex surface of the first semiconductor substrate 18 and the thin film insulator 16 provided on the surface of the second semiconductor substrate 14 contact each other, wherein the thin film insulator is the only circuit or device element located therebetween, to form a cavity in the semiconductor substrate device (see figure 3C).

Bang et al. is applied as above but lacks anticipation on disclosing an oxide as the thin film insulator, however Bang et al suggest using other suitable materials (see column 3, lines 42-44); in view of this disclosure, it would have been obvious to a person having ordinary skills in the art at the time the invention was made to select an oxide as the thin film insulator in the primary reference of Bang et al. since oxides are suitable thin film insulator materials. Furthermore selecting an oxide as the thin film insulator in the primary reference of Bang et al. is only considered to be the use of a preferred or optimum material that a person having ordinary skills in the art would have found obvious to use in order to obtain a desire device characteristic.

10. Claim13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itoigawa et al. U.S. Patent 5,946,549 A.

Itoigawa et al. is applied as above but lacks anticipation on disclosing the thin film silicon layer being thinner than the second semiconductor substrate, however,

selecting an optimum thickness value for the thin film silicon layer, e.g., thinner than the second semiconductor substrate, is only considered to be routine optimization of the device disclosed by Itoigawa et al. since Itoigawa et al. already discloses a thin film insulating layer, therefore optimizing the Itoigawa et al. invention by changing the thin film thickness to a desire thickness involve only routine skills in the art and it would have been obvious to a person having ordinary skills in the art at the time the invention was made to perform such a change based on a desire device performance.

Response to Arguments

11. Applicant's arguments with respect to claims 1, 3 and 6-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shimbo et al. discloses a semiconductor substrate device comprising a cavity formed by two semiconductor substrates bonded with a non-glass thin film insulator layer 4 (see figure 1).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

AR
May 3, 2003

John F. Niebling
Supervisory Patent Examiner
Technology Center 2800